

Appl. No. 10/659,799
Response to Office Action 11/01/2005
Date filed 01/03/2006

IN THE CLAIMS

Please amend claims 1, 15, 17-21, 29, and 61 as follows below.

The following is a complete listing of claims.

Marked-up Claim Listing

- 1 1. (Withdrawn) A patterned roller for a manufacturing
- 2 process, the patterned roller comprising:
- 3 an axle;
- 4 a cylindrical sleeve around the axle, the
- 5 cylindrical sleeve coaxial with the axle;
- 6 one or more patterned rings slidably engaged with
- 7 the cylindrical sleeve and perpendicular thereto, each
- 8 of the one or more patterned rings having a subpattern
- 9 of a pattern of the roller in an outer edge, each of
- 10 the one or more patterned rings having an inner edge
- 11 shaped to slidably engage the cylindrical sleeve, the
- 12 one or more patterned rings coaxial with the axle;
- 13 a first end flange and a second end flange
- 14 sandwiching the cylindrical sleeve and the one or more
- 15 patterned rings, the first end flange and the second
- 16 end flange coupled perpendicular and coaxial to the
- 17 axle; and
- 18 one or more fasteners coupled between the first
- 19 end flange and the second end flange, the one or more
- 20 fasteners to hold the first end flange and the second
- 21 end flange together sandwiching the cylindrical sleeve
- 22 and the one or more patterned rings.

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1 2. (Withdrawn) The patterned roller of claim 1, wherein
2 the one or more patterned rings, each having the
3 subpattern, form the pattern of the roller for rolling onto
4 a surface of a sheet of material.

1 3. (Withdrawn) The patterned roller of claim 1, wherein
2 the one or more fasteners are one or more pairs of nuts
3 and bolts coupled together.

1 4. (Withdrawn) The patterned roller of claim 1, further
2 comprising:

3 one or more spacer rings slidably engaged with
4 the cylindrical sleeve and perpendicular thereto, each
5 of the one or more spacer rings having an edge pattern
6 of the pattern of the roller in an outer edge, each of
7 the one or more spacer rings having an inner edge
8 shaped to slidably engage the cylindrical sleeve, the
9 one or more spacer rings coaxial with the axle.

1 5. (Withdrawn) The patterned roller of claim 4, wherein
2 the one or more patterned rings, each having the
3 subpattern, and the one or more spacer rings form the
4 pattern of the roller for rolling onto a surface of a sheet
5 of material.

1 6. (Withdrawn) The patterned roller of claim 4, wherein
2 a pair of the one or more spacer rings sandwiches a
3 patterned ring of the one or more patterned rings.

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1 7. (Withdrawn) The patterned roller of claim 1, further
2 comprising:
3 one or more rods parallel with the axle coupled
4 between the first end flange and the second end flange,
5 the one or more rods slidingly engaged with the one or
6 more patterned rings and perpendicular thereto;
7 and wherein
8 each of the one or more patterned rings having an
9 opening to slidingly engage the one or more rods and
10 hold a fixed rotational position around the axle.

1 8. (Withdrawn) The patterned roller of claim 1, wherein
2 the cylindrical sleeve includes a guide slot
3 parallel with the axle; and
4 each of the one or more patterned rings includes a
5 guide tab in an inner edge to slidingly engage the
6 guide slot and hold a fixed rotational position around
7 the axle.

1 9. (Withdrawn) The patterned roller of claim 1, further
2 comprising:
3 a motor to drive the roller;
4 a first bearing and a second bearing to support
5 the roller, the first bearing located near a first end
6 and the second bearing located near a second end of the
7 axle; and
8 a gear box coupled between the motor and the
9 first end of the axle, the gear box having gearing to

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10 proportionally rotate the roller in response to
11 rotations of a shaft of the motor.

1 10. (Currently Amended) A roller stack for forming a
2 corner cube pattern in a surface of a film, the roller stack
3 comprising:

4 a first roller; and

5 a second roller, the second roller having a
6 cylindrical corner cube pattern to roll over the
7 surface of the film and form the corner cube pattern
8 therein, the second roller including,

9 a rotatable shaft,

10 and

11 one or more rings coupled in parallel
12 together to the shaft, an outer edge of each of
13 the one or more rings having a respective
14 subpattern aligned together to form the
15 cylindrical corner cube pattern;

16 and

17 the film between the first roller and the second
18 roller, the second roller to press against the surface
19 of the film to form the corner cube pattern therein.

1 11. (Original) The roller stack of claim 10, further
2 comprising:

3 a third roller to cool the film.

1 12. (Previously Presented) The roller stack of claim
2 10, further comprising:

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3 a motor coupled to drive the rotatable shaft of
4 the second roller,
5 a first bearing and a second bearing to support
6 the second roller, the first bearing located near a
7 first end and the second bearing located near a second
8 end of the rotatable shaft; and
9 a gear box coupled between the motor and the
10 rotatable shaft, the gear box having gearing to
11 proportionally rotate the second roller in response to
12 rotations of the motor.

1 13. (Original) The roller stack of claim 12, further
2 comprising:
3 a third roller to cool the film.

1 14. (Original) The roller stack of claim 13, further
2 comprising:
3 a frame to rotatably support the first roller, the
4 second roller and the third roller in parallel
5 together.

1 15. (Currently Amended) A manufacturing system for the
2 manufacture of an extruded corner cube film, the
3 manufacturing system comprising:
4 an extruder to receive solid raw materials, the
5 extruder further to heat and extrude liquefied raw
6 materials; and
7 an extrusion die to receive the liquefied raw
8 materials, the extrusion die further to flatten the

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9 liquefied raw materials into a thin wide sheet of semi-
10 solid raw materials; and
11 a roller stack to receive the thin wide sheet of
12 semi-solid raw materials, the roller stack including,
13 a first roller and a second roller oriented
14 to receive the thin wide sheet of semi-solid raw
15 materials between them, the second roller ~~further~~
16 having a cylindrical corner cube pattern [[,]]
17 formed out of one or more rings [[,]] to roll over
18 a surface of the thin wide sheet of the semi-solid
19 raw materials and form a corner cube pattern
20 therein, the roller stack to output a thin wide
21 sheet of solid raw materials having the corner
22 cube pattern;
23 a pair of nip rollers to pull on the thin wide
24 sheet of solid raw materials to convey the thin wide
25 sheet of solid raw materials with the corner cube
26 pattern; and
27 a windup roller to receive the thin wide sheet of
28 solid raw materials with the corner cube pattern and
29 roll it up into a roll of corner cube sheeting.

1 16. (Original) The manufacturing system of claim 15,
2 wherein
3 the first roller to further cool the thin wide sheet of
4 semi-solid raw materials.

1 17. (Currently Amended) The manufacturing system of
2 claim 15, wherein
3 the roller stack further includes

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4 a third roller to cool the thin wide sheet of semi-
5 solid raw materials into the thin wide sheet of solid raw
6 materials with the corner cube pattern.

1 18. (Currently Amended) The manufacturing system of
2 claim 15, wherein
3 the second roller presses against the surface of the
4 thin wide sheet of semi-solid raw materials to form the
5 corner cube pattern therein.

1 19. (Currently Amended) The manufacturing system of
2 claim 15, wherein
3 the second roller further has
4 a rotatable shaft,
5 a motor coupled to one end of the rotatable
6 shaft to drive the rotatable shaft, and
7 one or more rings coupled in parallel
8 together to the shaft, [[in]] an outer edge of
9 each of the one or more rings having a respective
10 subpattern aligned together to form the
11 cylindrical corner cube pattern of the second
12 roller.

1 20. (Currently Amended) A method of manufacturing a
2 corner cube patterned film, the method comprising:
3 providing raw materials into a liquefied form;
4 shaping the liquefied form of raw materials into a thin
5 sheet;
6 rolling a corner cube patterned roller over a surface
7 of the thin sheet to form a corner cube pattern therein, the

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8 corner cube patterned roller including one or more rings
9 each having a respective subpattern of a cylindrical corner
10 cube pattern of the corner cube patterned roller;
11 and
12 winding the thin sheet with the corner cube pattern
13 into a roll.

1 21. (Currently Amended) The method of claim 20,
2 further comprising:
3 prior to winding, cooling the thin sheet with the
4 corner cube pattern using a first chill roller and a second
5 chill roller.

1 22. (Original) The method of claim 20, wherein,
2 a wind-up roller for the winding of the thin sheet into
3 the roll.

1 23. (Previously Presented) The method of claim 20,
2 wherein,
3 an extrusion die for the shaping of the liquefied form
4 of the raw materials into the thin sheet.

1 24. (Original) The method of claim 20, wherein,
2 an extruder for the providing of the raw materials into
3 the liquefied form.

1 25. (Original) The method of claim 20, wherein,
2 prior to the winding of the thin sheet, the method
3 further comprises
4 pulling the thin sheet.

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1 26. (Original) The method of claim 25, wherein,
2 a nip roller pair for the pulling of the thin sheet.

1 27. (Original) The method of claim 25, wherein,
2 prior to the pulling of the thin sheet, the method
3 further comprises
4 redirecting the thin sheet.

1 28. (Original) The method of claim 27, wherein,
2 an idler roller for the redirecting of the thin sheet.

1 29. (Currently Amended) A roll of extruded corner cube
2 film formed by the method of
3 extruding raw materials into a liquefied form;
4 shaping the liquefied form of raw materials into a thin
5 sheet;
6 rolling a corner cube patterned roller over a surface
7 of the thin sheet to form a corner cube pattern therein, the
8 corner cube patterned roller including one or more rings
9 each having a respective subpattern of a cylindrical corner
10 cube pattern of the patterned roller;
11 cooling the thin sheet with the corner cube pattern;
12 and
13 winding the thin sheet into a roll.

1 30. (Original) A method of manufacturing a reflective
2 film, the method comprising:
3 coupling a film into a roller stack;

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4 rolling and pressing a corner cube pattern of a
5 patterned roller into a surface of the film to form the
6 reflective film, the corner cube pattern formed of
7 subpatterns of one or more patterned rings; and
8 cooling the reflective film into a solid state.

1 31. (Original) The method of claim 30, wherein,
2 a chill roller for cooling the reflective film into the
3 solid state.

1 32. (Original) The method of claim 30, further
2 comprising:
3 pulling the film into the roller stack.

1 33. (Original) The method of claim 32, wherein,
2 the patterned roller is driven to pull the film into
3 the roller stack.

1 34. (Original) The method of claim 30, wherein,
2 a first chill roller and the patterned roller for
3 rolling and pressing the corner cube pattern of the
4 patterned roller into the surface of the film to form the
5 reflective film.

1 35. (Original) The method of claim 34, wherein,
2 a second chill roller for cooling the reflective film
3 into the solid state.

1 36. (Original) The method of claim 35, wherein,

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2 the roller stack includes the patterned roller, the
3 first chill roller, and the second chill roller.

1 37. (Original) The method of claim 30, further
2 comprising:
3 pulling the reflective film out of the roller stack.

1 38. (Previously Presented) The method of claim 35,
2 wherein,
3 the second chill roller is driven to pull the
4 reflective film out through the roller stack.

1 39. (Original) A reflective film formed by the method
2 of
3 coupling a film into a roller stack;
4 rolling and pressing a corner cube pattern of a
5 patterned roller into a surface of the film to form the
6 reflective film, the corner cube pattern formed of
7 subpatterns of one or more patterned rings; and
8 cooling the reflective film into a solid state.

1 40. (Original) A roll of reflective laminate sheeting
2 including a layer of reflective film formed by the method of
3 coupling a film into a roller stack;
4 rolling and pressing a corner cube pattern of a
5 patterned roller into a surface of the film to form the
6 reflective film, the corner cube pattern formed of
7 subpatterns of one or more patterned rings; and
8 cooling the reflective film into a solid state.

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1 41. (Original) An article of manufacture including a
2 portion of a reflective film formed by the method
3 coupling a film into a roller stack;
4 rolling and pressing a corner cube pattern of a
5 patterned roller into a surface of the film to form the
6 reflective film, the corner cube pattern formed of
7 subpatterns of one or more patterned rings; and
8 winding the reflective film into a roll.

1 42. (Original) The article of manufacture of claim 41,
2 wherein
3 the article of manufacture is one or more of
4 a license plate, a shoe, a highway sign, an
5 article of clothing, a pavement marker, an
6 automobile reflector, and a bicycle reflector.

1 43. (Original) A roll of film comprising:
2 an optical film rolled up into a roll, the optical film
3 including a first side having
4 a plurality of columns of full corner cubes,
5 each adjacent column of full corner cubes
6 having a pattern of full corner cubes offset from
7 the next, and
8 a groove between each of the plurality of
9 columns of full corner cubes.

1 44. (Original) The roll of film of claim 43, wherein
2 the optical film further includes a second side having

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3 an adhesive to adhere the optical film to a
4 surface.

1 45. (Original) The roll of film of claim 44, wherein
2 the second side of optical film further has
3 a release layer to protect the adhesive.

1 46. (Original) The roll of film of claim 43, wherein
2 the full corner cubes in the first side reflect
3 incident light, and
4 the optical film further includes a second side having
5 a reflective layer to further reflect the
6 incident light.

1 47. (Original) The roll of film of claim 43, wherein
2 the full corner cubes in the first side reflect
3 incident light, and
4 the first side of the optical film further has
5 a reflective layer to further reflect the
6 incident light.

1 48. (Original) The roll of film of claim 47, wherein
2 the first side of the optical film further has
3 an adhesive to adhere the optical film to a
4 surface.

1 49. (Original) The roll of film of claim 43, wherein
2 the plurality of columns of full corner cubes is a
3 seamless plurality of columns of full corner cubes.

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1 50. (Original) A reflective film comprising:
2 an optical material formed into a body region and an
3 optical region, the body region to support the optical
4 region; and
5 the optical region having N columns of corner cubes
6 without seams, the optical region formed by
7 rolling a patterned roller over a surface of
8 a film, the patterned roller including N patterned
9 rings.

1 51. (Original) The reflective film of claim 50,
2 wherein
3 the optical region further has M grooves interspersed
4 between the N columns of corner cubes, and
5 the optical region being further formed by the
6 patterned roller further including M spacer rings.

1 52. (Original) The reflective film of claim 50,
2 wherein
3 the optical material is a thermoplastic.

1 53. (Original) A reflector to reflect an incident
2 light source of an incident angle back at a reflective
3 angle, the reflector including:
4 a laminate having a reflective layer, the reflective
5 layer including a surface comprised of
6 N columns of full corner cubes without seams, each of
7 the full corner cubes being shaped as a triangular pyramid,
8 and

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9 M grooves, each groove separating a pair of columns of
10 full corner cubes without seams.

1 54. (Original) The reflector of claim 53, wherein
2 each full corner cube includes a base, a head, a tail,
3 and three reflective surfaces joined at an apex.

1 55. (Original) The reflector of claim 53, wherein
2 each full corner cube is a male corner cube.

1 56. (Original) The reflector of claim 53, wherein
2 the full corner cubes are aligned in rows.

1 57. (Original) The reflector of claim 56, wherein
2 the full corner cubes in even columns are aligned in
3 rows from head to tail and the full corner cubes in odd
4 columns are aligned in rows from tail to head.

1 58. (Previously Presented) The reflector of claim 53,
2 wherein
3 the laminate further includes an adhesive layer to
4 couple the reflective layer to a surface.

1 59. (Original) The reflector of claim 53, wherein
2 the N columns of full corner cubes without seams and
3 the M grooves are formed by
4 rolling a patterned roller over a surface of
5 a film, the patterned roller including N patterned
6 rings and M spacer rings.

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1 60. (Original) The reflector of claim 53, wherein
2 the reflector is one or more of a license plate, a
3 shoe, a highway sign, an article of clothing, a pavement
4 marker, an automobile reflector, and a bicycle reflector.

1 61. (Currently Amended) The reflector of claim 53,
2 wherein
3 each of the full corner cubes is shaped as an
4 asymmetric ~~triangular~~ triangular pyramid.

1 62. (Previously Presented) The reflector of claim 53,
2 wherein
3 each of the full corner cubes is shaped as a symmetric
4 triangular pyramid.